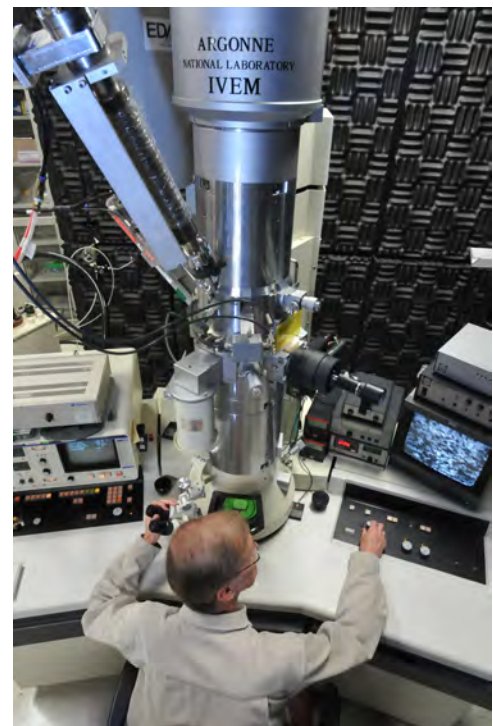


IVEM-Tandem Facility

Hitachi H-9000NAR TEM (IVEM) capabilities:

1. Instrument specifications:
 - a) Accelerating voltages: 100-300 kV
 - b) LaB₆ emitter
 - c) Resolution (at 300 kV): ~0.25 nm point; ~0.14 nm line
 - d) Spherical aberration coefficient (Cs): 2.8 mm
 - e) Specimen chamber vacuum: $< 1 \times 10^{-7}$ Torr
 - f) Minimum spot size at 300 kV: ~ 8 nm
 - g) Magnification: 200x to 1 Mx
2. Operating modes: CTEM, CBED, SAED, light element XEDS.
3. EMC-owned specimen holders:
 - a) Double Tilt ($\pm 45^\circ \alpha$, $\pm 30^\circ \beta$):
 - with Be cup for XEDS
 - heating (900°C)
 - liquid He cooled (15 K)
 - b) Single Tilt ($\pm 45^\circ$):
 - tensile/heating (600 K);
 - electrical bias/heating (800 K)
 - gas reaction cell (*ex situ*, 1000 K)
 - c) Double Tilt and Rotate (ambient temperature): $\pm 45^\circ \alpha$, $\pm 15^\circ \beta$, 360° rotation
4. Digital and Video recording capabilities:
 - a) On-axis CCD camera: 11 Mp, 14 bits, 10 fps movie recording capability
 - b) On-axis, video-rate, image-intensified camera (NTSC)



***In situ* irradiation capabilities:**

1. Ion implanter: any allowed ion up to 500 keV, single charged; 1MeV if double charged.
2. Tandem Van de Graaf: 2 MeV He⁺¹, 1.8 MeV Ne⁺¹, 0.9 MeV Ar⁺¹, 0.4 MeV Kr⁺¹
3. Ion beam dosimetry within 2 cm of specimen: skim cup, Faraday cup system, Faraday cup

holder

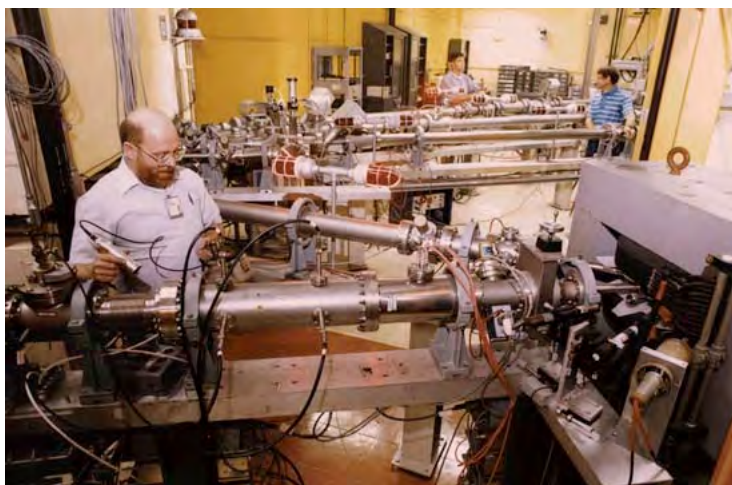
4. Angle between electron and ion beam: 30°
5. Ion beam diameter at TEM specimen position: ~ 1.5 mm

Users' research interests (examples):

Radiation effects (fission/fusion reactor materials), radioactive waste storage, ion-beam processing (surface modification, etc.), ion-solid interactions.

Ion accelerators and target chambers

The accelerators are located above the IVEM on the second floor of G-wing, building 212.



Experiments not using the IVEM are carried out in specimen chambers in the accelerator target area.



An electrostatic deflector is used to get ion beams down to the IVEM.

Specifications of ion accelerators:

Accelerator	Ion Source Types	Typical Ion Species and Energies	Typical Flux at the Specimen
650 kV NEC Ion Implanter	Duoplasmatron Danfysik 910 and 911	noble gases, H, Fe, Ni, Cu, Au 0.02-0.6 MeV	$1 \times 10^{12} \text{ cm}^{-2}\text{s}^{-1}$
2 MV NEC Tandem Van de Graaf	Internal: Duoplasmatron External: Alphasatros, SNICS	noble gases, H, S, Fe, Ni, Cu, Au 0.3-5.0 MeV	$1 \times 10^{12} \text{ cm}^{-2}\text{s}^{-1}$

Scheduling IVEM time:

Users must request instrument time after their EMC proposals have been approved through the [proposal review process](#). Complete an [IVEM Use Request Form](#) and send it by email to the IVEM-Tandem Facility Coordinator.